Space Weather Forecast

Issued on Tuesday, 18 July 2023 at 01:30 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Minor/Moderate R1/R2 Blackouts likely throughout. Chance of Minor Geomagnetic Storms during 18 July.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity is Moderate with an M-class flare at the end of the day and a number of Common class flares observed. The largest at 17/2359 UTC from a grouping of sunspots located in the southwest and currently nearing the limb. This large sunspot also generated a number of flares as did another large region in the northeast. There are currently eight sunspot regions on the visible disc. A number of CMEs (Coronal Mass Ejections) were observed leaving the Sun over the past 24 hours, however none of them are currently considered Earth-directed. The largest and fastest CMEs originated from a region located well beyond the western horizon. Further CMEs from the large region in the southwest have been analysed as not being Earth-directed.

Solar Wind / Geomagnetic Activity: The solar wind is now at elevated levels following the arrival of a CME around 16/1800 UTCC that probably left the sun on 14 July. The solar wind rose from slightly elevated levels. The total magnetic field was initially at moderate levels, but then steadily weakened and is now Weak. The north-south component has passed through a period of moderately negative strength around 17/0700 UTC and is now at Weal levels again. Geomagnetic activity was at Quiet to Unsettled levels with periods of Active due to effects of the CME arrival on the Earths magnetic field. A G1/Minor Storm interval was observed early on 17 July.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) has been below the S1/Minor Storm threshold throughout on a declining trend.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity is likely to remain at Low to Moderate levels, with a slight chance of Strong flares, probably most likely from the aforementioned large sunspot region in the northeast.
Solar Wind / Geomagnetic Activity: Current CME influence is expected to gradually ease into 18 July. A fast solar wind could then connect on 18 and 19 July, but this is low confidence due to the weak appearance of the feature. Solar wind conditions are then forecast to decline towards background from later on 19 and into 20 July. Unsettled to Active geomagnetic activity is likely at first, with a Chance of Minor geomagnetic storms. Ongoing CME effects are expected into 18 July, before gradually easing back to mainly Quiet with Unsettled spells by 19 Jul. However any further enhancement from the fast solar wind is likely to bring a spell of Active conditions, most likely on 19 July.

Energetic Particles / Solar Radiation: No solar radiation storms are currently expected, but there is a slight chance of reaching the S1/Minor Storm threshold through the period, should any

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large X-ray flares occur.

Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	Yes	40	5	1	1
Strong	G3	No	10	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	60	60	60	70
Very Active	R3 to R5 X	No	10	10	10	20

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	20	15	10	10
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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